REMARKS

Favorable reconsideration is respectfully requested.

The claims are 1-3 and 5-6. Claims 1 and 6 are currently amended. Claims 4 and 7 are cancelled.

The amendment to claim 1 is supported in original claim 4. The amendment to claim 6 is editorial and self-explanatory.

No new matter is added.

Claim Rejections - 35 U.S.C. §103

Claims 1-7 are rejected under 35 U.S.C. §103(a) as being unpatentable over Iyoshi et al., ("Application of QCM covered with MPS film as humidity sensor" (2000)) in view of Kamisho et al., ("Ion recognition utilizing surfactant- silica nano structure" (2001)).

Applicants respectfully traverse this rejection.

The present invention is directed to a crystal oscillator nanochannel sensor which comprises a nanochannel body thin film with an oxide layer which includes surfactant micelles disposed on the surface of an electrode on a crystal oscillator of a crystal oscillator microbalance. The sensor detects a change in the weight of the nanochannel body thin film, which is caused by a collected target substance in a sample liquid phase by a change in the frequency of the crystal oscillator.

Iyoshi teaches a humidity vapor sensor. Since the sensor is used in the vapor phase, and detects moisture in the vapor phase, Iyoshi does not disclose or suggest the detection of a target substance in a sample liquid phase as presently recited in claim 1.

Furthermore, Iyoshi teaches that the frequency change of a QCM coated with a mesoporous silica (MPS) film prior to removal of the surfactant is greater than that of the QCM prior to coating with the MPS. Iyoshi, however, also indicates that the frequency change of the QCM coated with the mesoporous silica film after calcination is greater than that of the QCM coated with the mesoporous silica film before calcination. This shows that the presence of the surfactant acts in a disadvantageous manner in the QCM of Iyoshi. This is an expected and

natural result of the Iyoshi QCM because the presence of the surfactant provides a hydrophobic environment. Iyoshi discloses that they produce holes in the MPS film by calcination, and the MPS/QCM is used as a humidity sensor by adsorption or desorption of water onto the MPS film. This shows that the surfactant of Iyoshi does not play a role in the sensor's detection of humidity because of the hydrophobic environment provided by the surfactant.

Kamisho teaches the detection of an alkaline metal ion in an aqueous solution by using hydrophobic fields provided by the presence of a surfactant. However, the combination of Iyoshi and Kamisho is improper because Iyoshi does not disclose or suggest the detection of the existence of a target substance in a sample liquid phase.

Iyoshi also does not utilize the surfactant in the sensor's detection of humidity because of the hydrophobic environment provided by the surfactant as discussed above. Therefore, while Kamisho discloses a surfactant-silica nano structure, one of ordinary skill in the art would not be able to modify Iyoshi with the features of Kamisho to arrive at the present invention.

Accordingly, Iyoshi in view of Kamisho does not disclose or suggest all of the features of the present claims.

No further issues remaining, allowance of this application is respectfully requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact undersigned at the telephone number below.

Respectfully submitted,

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